

Release notes for ENDF/B Development n-040_Zr_093
evaluation



April 26, 2017

- **psyche** Warnings:

1. Gamma width not in agreement with PSYCHE's expectations

FILE 2 / SECTION 151 / ISOTOPE MASS = 93. L = 1 / AT RESONANCE ENERGY 5.92400E+03 EV. THE GAMMA WIDTH 2.00000E-03 DEVIATES TOO MUCH FROM THE AVERAGE 2.37189E-01 (0): Gamma width

```
FILE 2
SECTION 151
ISOTOPE MASS = 93. L = 1
AT RESONANCE ENERGY 5.92400E+03 EV. THE GAMMA WIDTH 2.00000E-03 DEVIATES TOO MUCH FROM THE AVERAGE 2.37189E-01 (0): Gamma width
```

2. Strength function in URR not in agreement with PSYCHE's expectations

FILE 2 / SECTION 151 / ISOTOPE MASS = 93. L = 1 / STRENGTH FUNCTION IS 8.67844E-04 / STRENGTH FUNCTION 8.67844E-04 / LIES OUTSIDE LIMITS 1.00000E-04 TO 8.00000E-04 (0): URR str. ftn.

```
FILE 2
SECTION 151
ISOTOPE MASS = 93. L = 1
STRENGTH FUNCTION IS 8.67844E-04
STRENGTH FUNCTION 8.67844E-04
... [1 more lines]
```

- **recent** Warnings:

1. Statistical weight of certain L values were incorrect
0: RRR goof (a)

```
Calculate Cross Sections from Resonance Parameters (RECENT 2015-1)
=====
Retrieval Criteria----- MAT
File 2 Minimum Cross Section- 1.0000E-10 (Standard Option)
Reactions with No Background- Output (Resonance Contribution)
... [535 more lines]
```

- **fudge-4.0** Warnings:

1. Missing a channel with a particular angular momenta combination
resonances / resolved (Error # 1): missingResonanceChannel

WARNING: Missing a channel with angular momenta combination L = 0, J = 1.0 and S = 1.0 for "capture"
WARNING: Missing a channel with angular momenta combination L = 1, J = 1.0 and S = 1.0 for "capture"
WARNING: Missing a channel with angular momenta combination L = 1, J = 2.0 and S = 1.0 for "capture"
WARNING: Missing a channel with angular momenta combination L = 1, J = 2.0 and S = 2.0 for "capture"
... plus 1 more instances of this message

2. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
Section 1 (n + Zr93): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

- The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 2 ((z,n)): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

- The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 3 (n/multiplicity:'2'] + Zr92 + gamma): / Form 'eval': (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

- The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.

Section 4 (Zr94 + gamma): / Form 'eval': / Component 1 (Error # 0): Condition num.

WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small

- fudge-4.0 Errors:

- The spin statistical weights are off, indicating missing channels
resonances / resolved / MultiLevel_BreitWigner (Error # 0): badSpinStatisticalWeights

WARNING: The spin statical weights for L=1 sums to 2.0, but should sum to 3.0. You have too few channels for re-

- Found a negative probability
reaction label 26: n + (Zr93_c -> Zr93 + gamma) / Product: n / Distribution: / energyAngular - XYs3d: (Error # 0): Negative prob.

WARNING: Negative probabilities encountered. Incident energy: 1.5e7 eV, worst case: -3.18784412818e-07

WARNING: Negative probabilities encountered. Incident energy: 1.8e7 eV, worst case: -3.00671660505e-08

WARNING: Negative probabilities encountered. Incident energy: 1.9e7 eV, worst case: -5.29539551983e-07

WARNING: Negative probabilities encountered. Incident energy: 2.e7 eV, worst case: -4.29004361481e-07

- Calculated and tabulated Q values disagree.

reaction label 27: n/multiplicity:'2'] + Zr92 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -6670914.087371826 eV vs -6.733e6 eV!

- Found a negative probability
reaction label 27: n/multiplicity:'2'] + Zr92 + gamma / Product: n / Distribution: / energyAngular - XYs3d: (Error # 0): Negative prob.

WARNING: Negative probabilities encountered. Incident energy: 1.9e7 eV, worst case: -2.36078374932e-08

WARNING: Negative probabilities encountered. Incident energy: 2.e7 eV, worst case: -1.81357794214e-08

- Calculated and tabulated Q values disagree.

reaction label 28: n/multiplicity:'3'] + Zr91 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -15314915.4400177 eV vs -1.5368e7 eV!

- Calculated and tabulated Q values disagree.

reaction label 29: n + H1 + Y92 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -9552422.710662842 eV vs -7.367e6 eV!

7. Calculated and tabulated Q values disagree.
reaction label 30: n + H2 + Y91 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -13909187.25889587 eV vs -7.65e6 eV!

8. Calculated and tabulated Q values disagree.
reaction label 31: H1 + Y93 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -2035899.795333862 eV vs -2.111e6 eV!

9. Calculated and tabulated Q values disagree.
reaction label 32: H1 + Y93_e1 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -2626119.795333862 eV vs -2701220. eV!

10. Calculated and tabulated Q values disagree.
reaction label 33: H1 + Y93_e2 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -2794619.795333862 eV vs -2869720. eV!

11. Calculated and tabulated Q values disagree.
reaction label 34: H1 + Y93_e3 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -2911749.795333862 eV vs -2986850. eV!

12. Calculated and tabulated Q values disagree.
reaction label 35: H1 + Y93_e4 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3171889.795333862 eV vs -3246990. eV!

13. Calculated and tabulated Q values disagree.
reaction label 36: H1 + Y93_e5 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3313839.795333862 eV vs -3388940. eV!

14. Calculated and tabulated Q values disagree.
reaction label 37: H1 + Y93_e6 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3336419.795333862 eV vs -3411520. eV!

15. Calculated and tabulated Q values disagree.
reaction label 38: H1 + Y93_e7 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3344459.795333862 eV vs -3419560. eV!

16. Calculated and tabulated Q values disagree.
reaction label 39: H1 + Y93_e8 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3578629.795333862 eV vs -3653730. eV!

17. Calculated and tabulated Q values disagree.
reaction label 40: H1 + Y93_e9 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3682879.795333862 eV vs -3757980. eV!

18. Calculated and tabulated Q values disagree.
reaction label 41: H1 + Y93_e10 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -3731809.795333862 eV vs -3806910. eV!
19. Calculated and tabulated Q values disagree.
reaction label 42: H1 + Y93_e11 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -3822369.795333862 eV vs -3897470. eV!
20. Calculated and tabulated Q values disagree.
reaction label 43: H1 + Y93_e12 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -3888569.795333862 eV vs -3963670. eV!
21. Calculated and tabulated Q values disagree.
reaction label 44: H1 + Y93_e13 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -3947359.795333862 eV vs -4022460. eV!
22. Calculated and tabulated Q values disagree.
reaction label 45: H1 + Y93_e14 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -4035899.795333862 eV vs -4.111e6 eV!
23. Calculated and tabulated Q values disagree.
reaction label 46: H1 + Y93_e15 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -4092469.795333862 eV vs -4167570. eV!
24. Calculated and tabulated Q values disagree.
reaction label 47: H1 + Y93_e16 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -4105899.795333862 eV vs -4.181e6 eV!
25. Calculated and tabulated Q values disagree.
reaction label 48: H1 + (Y93_c -> Y93 + gamma) (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: -4105899.795333862 eV vs -4.181e6 eV!
26. Calculated and tabulated Q values disagree.
reaction label 49: He4 + Sr90 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 4493325.712371826 eV vs 4.471e6 eV!
27. Calculated and tabulated Q values disagree.
reaction label 50: He4 + Sr90_e1 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 3661645.712371826 eV vs 3639320. eV!
28. Calculated and tabulated Q values disagree.
reaction label 51: He4 + Sr90_e2 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 2837415.712371826 eV vs 2815090. eV!

29. Calculated and tabulated Q values disagree.
reaction label 52: He4 + Sr90_e3 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 2600965.712371826 eV vs 2578640. eV!
30. Calculated and tabulated Q values disagree.
reaction label 53: He4 + Sr90_e4 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 2286305.712371826 eV vs 2263980. eV!
31. Calculated and tabulated Q values disagree.
reaction label 54: He4 + Sr90_e5 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1996005.712371826 eV vs 1973680. eV!
32. Calculated and tabulated Q values disagree.
reaction label 55: He4 + Sr90_e6 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1965405.712371826 eV vs 1943080. eV!
33. Calculated and tabulated Q values disagree.
reaction label 56: He4 + Sr90_e7 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1922725.712371826 eV vs 1.9004e6 eV!
34. Calculated and tabulated Q values disagree.
reaction label 57: He4 + Sr90_e8 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1907325.712371826 eV vs 1.885e6 eV!
35. Calculated and tabulated Q values disagree.
reaction label 58: He4 + Sr90_e9 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1819325.712371826 eV vs 1.797e6 eV!
36. Calculated and tabulated Q values disagree.
reaction label 59: He4 + Sr90_e10 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1565625.712371826 eV vs 1.5433e6 eV!
37. Calculated and tabulated Q values disagree.
reaction label 60: He4 + Sr90_e11 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1522205.712371826 eV vs 1499880. eV!
38. Calculated and tabulated Q values disagree.
reaction label 61: He4 + Sr90_e12 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1460455.712371826 eV vs 1438130. eV!
39. Calculated and tabulated Q values disagree.
reaction label 62: He4 + Sr90_e13 (Error # 0): Q mismatch
- WARNING: Calculated and tabulated Q-values disagree: 1455325.712371826 eV vs 1.433e6 eV!

40. Calculated and tabulated Q values disagree.
reaction label 63: He4 + Sr90_e14 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1454065.712371826 eV vs 1431740. eV!

41. Calculated and tabulated Q values disagree.
reaction label 64: He4 + Sr90_e15 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1348425.712371826 eV vs 1.3261e6 eV!

42. Calculated and tabulated Q values disagree.
reaction label 65: He4 + Sr90_e16 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1347325.712371826 eV vs 1.325e6 eV!

43. Calculated and tabulated Q values disagree.
reaction label 66: He4 + Sr90_e17 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1225325.712371826 eV vs 1.203e6 eV!

44. Calculated and tabulated Q values disagree.
reaction label 67: He4 + Sr90_e18 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1109935.712371826 eV vs 1087610. eV!

45. Calculated and tabulated Q values disagree.
reaction label 68: He4 + Sr90_e19 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1099325.712371826 eV vs 1.077e6 eV!

46. Calculated and tabulated Q values disagree.
reaction label 69: He4 + Sr90_e20 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1043505.712371826 eV vs 1021180. eV!

47. Calculated and tabulated Q values disagree.
reaction label 70: He4 + Sr90_e21 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 1014325.712371826 eV vs 9.92e5 eV!

48. Calculated and tabulated Q values disagree.
reaction label 71: He4 + Sr90_e22 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 985325.7123718262 eV vs 9.63e5 eV!

49. Calculated and tabulated Q values disagree.
reaction label 72: He4 + Sr90_e23 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 937525.7123718262 eV vs 9.152e5 eV!

50. Calculated and tabulated Q values disagree.
reaction label 73: He4 + Sr90_e24 (Error ≠ 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 908905.7123718262 eV vs 886580. eV!

51. Calculated and tabulated Q values disagree.
reaction label 74: He4 + Sr90_e25 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 899325.7123718262 eV vs 8.77e5 eV!

52. Calculated and tabulated Q values disagree.
reaction label 75: He4 + Sr90_e26 (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 866315.7123718262 eV vs 843990. eV!

53. Calculated and tabulated Q values disagree.
reaction label 76: He4 + (Sr90_c -> Sr90 + gamma) (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 866315.7123718262 eV vs 843990. eV!

54. Calculated and tabulated Q values disagree.
reaction label 77: Zr94 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: 8254200.400100708 eV vs 8.22e6 eV!

55. Calculated and tabulated Q values disagree.
reaction label 78: n + He4 + Sr89 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -3305066.812271118 eV vs -3.335e6 eV!

56. Found a negative probability
reaction label 78: n + He4 + Sr89 + gamma / Product: n / Distribution: / energyAngular - XYs3d: (Error # 0): Negative prob.

WARNING: Negative probabilities encountered. Incident energy: 1.9e7 eV, worst case: -9.87321246872e-12
WARNING: Negative probabilities encountered. Incident energy: 2.e7 eV, worst case: -1.34023045052e-12

57. Calculated and tabulated Q values disagree.
reaction label 79: n[multiplicity:'2'] + He4 + Sr88 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -9600154.75390625 eV vs -9.693e6 eV!

58. Calculated and tabulated Q values disagree.
reaction label 80: n[multiplicity:'2'] + H1 + Y91 + gamma (Error # 0): Q mismatch

WARNING: Calculated and tabulated Q-values disagree: -16129380.26159668 eV vs -7.65e6 eV!

59. Energy range of data set does not match cross section range
reaction label 80: n[multiplicity:'2'] + H1 + Y91 + gamma / Product: gamma / Multiplicity: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (7733054.0 -> 20000000.0) vs (7733060.0 -> 20000000.0)

60. Energy range of data set does not match cross section range
reaction label 80: n[multiplicity:'2'] + H1 + Y91 + gamma / Product: gamma / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

WARNING: Domain doesn't match the cross section domain: (7733054.0 -> 20000000.0) vs (7733060.0 -> 20000000.0)

61. Energy range of data set does not match cross section range
reaction label 80: n[multiplicity:'2'] + H1 + Y91 + gamma / Product: gamma / uncorrelated - energy - XYs2d: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (7733054.0 -> 20000000.0) vs (7733060.0 -> 20000000.0)
```

62. Calculated and tabulated Q values disagree.
reaction label 81: H1 + He4 + Rb89 + gamma (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -7032184.263565063 eV vs -7.049e6 eV!
```

63. Calculated and tabulated Q values disagree.
reaction label 82: H2 + (Y92_s -> Y92 + gamma) (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -7332229.707977295 eV vs -7.367e6 eV!
```

- **njoy2012** Warnings:

1. Recoil is not given, so one-particle recoil approximation used.
heatr...prompt kerma (0): HEATR/hinit (4)

```
---message from hinit---mf6, mt102 does not give recoil za= 40094
      photon momentum recoil used.
```

2. Coefficient mismatch of some sort
covr...process covariance data (1): COVR/matshd (2)

```
---message from matshd---processing of mat/mt 4034/ 16 vs. mat1/mt1 4034/ 16
      largest coefficient= 1.24367E+00 at index 514 515
```

3. The number of coefficients is too big.
covr...process covariance data (2): COVR/matshd (3)

```
---message from matshd--- 64 coefficients > 1
      reset and continue.
```

- **njoy2012** Errors:

1. An angular distribution is negative
acer...monte carlo neutron and photon data (0): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found
      17 for mt= 16 e= 8.802E+00
```

2. An angular distribution is negative
acer...monte carlo neutron and photon data (1): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found
      42 for mt= 16 e= 9.479E+00
```

3. An angular distribution is negative
acer...monte carlo neutron and photon data (2): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found
      93 for mt= 16 e= 1.016E+01
```

4. An angular distribution is negative
acer...monte carlo neutron and photon data (3): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    137 for mt= 16 e= 1.049E+01
```

5. An angular distribution is negative
acer...monte carlo neutron and photon data (4): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    162 for mt= 16 e= 1.083E+01
```

6. An angular distribution is negative
acer...monte carlo neutron and photon data (5): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    177 for mt= 16 e= 1.117E+01
```

7. An angular distribution is negative
acer...monte carlo neutron and photon data (6): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    188 for mt= 16 e= 1.151E+01
```

8. An angular distribution is negative
acer...monte carlo neutron and photon data (7): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    262 for mt= 16 e= 1.185E+01
```

9. An angular distribution is negative
acer...monte carlo neutron and photon data (8): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    2 for mt= 16 e= 1.058E+01
```

10. An angular distribution is negative
acer...monte carlo neutron and photon data (9): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    24 for mt= 16 e= 1.093E+01
```

11. An angular distribution is negative
acer...monte carlo neutron and photon data (10): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    21 for mt= 16 e= 1.128E+01
```

12. An angular distribution is negative
acer...monte carlo neutron and photon data (11): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    34 for mt= 16 e= 1.163E+01
```

13. An angular distribution is negative
acer...monte carlo neutron and photon data (12): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
42 for mt= 16 e= 1.199E+01
```

14. An angular distribution is negative
acer...monte carlo neutron and photon data (13): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
52 for mt= 16 e= 1.234E+01
```

15. An angular distribution is negative
acer...monte carlo neutron and photon data (14): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
60 for mt= 16 e= 1.269E+01
```

16. An angular distribution is negative
acer...monte carlo neutron and photon data (15): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
17 for mt= 22 e= 8.798E+00
```

17. An angular distribution is negative
acer...monte carlo neutron and photon data (16): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
24 for mt= 22 e= 9.137E+00
```

18. An angular distribution is negative
acer...monte carlo neutron and photon data (17): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
42 for mt= 22 e= 9.475E+00
```

19. An angular distribution is negative
acer...monte carlo neutron and photon data (18): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
53 for mt= 22 e= 9.814E+00
```

20. An angular distribution is negative
acer...monte carlo neutron and photon data (19): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
93 for mt= 22 e= 1.015E+01
```

21. An angular distribution is negative
acer...monte carlo neutron and photon data (20): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
137 for mt= 22 e= 1.049E+01
```

22. An angular distribution is negative
acer...monte carlo neutron and photon data (21): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
162 for mt= 22 e= 1.083E+01
```

23. An angular distribution is negative
acer...monte carlo neutron and photon data (22): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    177 for mt= 22 e= 1.117E+01
```

24. An angular distribution is negative
acer...monte carlo neutron and photon data (23): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    2 for mt= 22 e= 1.057E+01
```

25. An angular distribution is negative
acer...monte carlo neutron and photon data (24): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    24 for mt= 22 e= 1.092E+01
```

26. An angular distribution is negative
acer...monte carlo neutron and photon data (25): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    21 for mt= 22 e= 1.128E+01
```

27. An angular distribution is negative
acer...monte carlo neutron and photon data (26): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    34 for mt= 22 e= 1.163E+01
```

28. An angular distribution is negative
acer...monte carlo neutron and photon data (27): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    42 for mt= 22 e= 1.198E+01
```

29. An angular distribution is negative
acer...monte carlo neutron and photon data (28): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    52 for mt= 22 e= 1.233E+01
```

30. An angular distribution is negative
acer...monte carlo neutron and photon data (29): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    4 for mt= 91 e= 9.892E+00
```

31. An angular distribution is negative
acer...monte carlo neutron and photon data (30): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    27 for mt= 91 e= 1.018E+01
```

32. An angular distribution is negative
acer...monte carlo neutron and photon data (31): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
21 for mt= 91 e= 1.047E+01
```

33. An angular distribution is negative
acer...monte carlo neutron and photon data (32): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
31 for mt= 91 e= 1.077E+01
```

34. An angular distribution is negative
acer...monte carlo neutron and photon data (33): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
54 for mt= 91 e= 1.106E+01
```

35. An angular distribution is negative
acer...monte carlo neutron and photon data (34): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
51 for mt= 91 e= 1.135E+01
```

36. An angular distribution is negative
acer...monte carlo neutron and photon data (35): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
52 for mt= 91 e= 1.164E+01
```

37. An angular distribution is negative
acer...monte carlo neutron and photon data (36): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
59 for mt= 91 e= 1.193E+01
```

38. An angular distribution is negative
acer...monte carlo neutron and photon data (37): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
3 for mt= 91 e= 1.284E+01
```

39. An angular distribution is negative
acer...monte carlo neutron and photon data (38): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
1 for mt= 91 e= 1.317E+01
```

40. An angular distribution is negative
acer...monte carlo neutron and photon data (39): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
3 for mt= 91 e= 1.383E+01
```

41. An angular distribution is negative
acer...monte carlo neutron and photon data (40): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
1 for mt= 91 e= 1.416E+01
```

42. An angular distribution is negative
acer...monte carlo neutron and photon data (41): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    1 for mt= 91 e= 1.449E+01
```

43. An angular distribution is negative
acer...monte carlo neutron and photon data (42): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    1 for mt= 91 e= 1.482E+01
```

44. An angular distribution is negative
acer...monte carlo neutron and photon data (43): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    17 for mt= 91 e= 8.803E+00
```

45. An angular distribution is negative
acer...monte carlo neutron and photon data (44): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    26 for mt= 91 e= 9.141E+00
```

46. An angular distribution is negative
acer...monte carlo neutron and photon data (45): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    42 for mt= 91 e= 9.480E+00
```

47. An angular distribution is negative
acer...monte carlo neutron and photon data (46): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    53 for mt= 91 e= 9.818E+00
```

48. An angular distribution is negative
acer...monte carlo neutron and photon data (47): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    93 for mt= 91 e= 1.016E+01
```

49. An angular distribution is negative
acer...monte carlo neutron and photon data (48): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    137 for mt= 91 e= 1.050E+01
```

50. An angular distribution is negative
acer...monte carlo neutron and photon data (49): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    162 for mt= 91 e= 1.083E+01
```

51. An angular distribution is negative
acer...monte carlo neutron and photon data (50): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
177 for mt= 91 e= 1.117E+01
```

52. An angular distribution is negative
acer...monte carlo neutron and photon data (51): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
188 for mt= 91 e= 1.151E+01
```

53. An angular distribution is negative
acer...monte carlo neutron and photon data (52): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
262 for mt= 91 e= 1.185E+01
```

54. An angular distribution is negative
acer...monte carlo neutron and photon data (53): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
288 for mt= 91 e= 1.219E+01
```

55. An angular distribution is negative
acer...monte carlo neutron and photon data (54): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
267 for mt= 91 e= 1.253E+01
```

56. An angular distribution is negative
acer...monte carlo neutron and photon data (55): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
182 for mt= 91 e= 1.287E+01
```

57. An angular distribution is negative
acer...monte carlo neutron and photon data (56): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
142 for mt= 91 e= 1.320E+01
```

58. An angular distribution is negative
acer...monte carlo neutron and photon data (57): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
95 for mt= 91 e= 1.354E+01
```

59. An angular distribution is negative
acer...monte carlo neutron and photon data (58): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
100 for mt= 91 e= 1.388E+01
```

60. An angular distribution is negative
acer...monte carlo neutron and photon data (59): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
59 for mt= 91 e= 1.422E+01
```

61. An angular distribution is negative
acer...monte carlo neutron and photon data (60): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    7 for mt= 91 e= 1.456E+01
```

62. An angular distribution is negative
acer...monte carlo neutron and photon data (61): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    7 for mt= 91 e= 1.490E+01
```

63. An angular distribution is negative
acer...monte carlo neutron and photon data (62): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    1 for mt= 91 e= 1.524E+01
```

64. An angular distribution is negative
acer...monte carlo neutron and photon data (63): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    2 for mt= 91 e= 1.058E+01
```

65. An angular distribution is negative
acer...monte carlo neutron and photon data (64): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    24 for mt= 91 e= 1.093E+01
```

66. An angular distribution is negative
acer...monte carlo neutron and photon data (65): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    21 for mt= 91 e= 1.128E+01
```

67. An angular distribution is negative
acer...monte carlo neutron and photon data (66): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    34 for mt= 91 e= 1.163E+01
```

68. An angular distribution is negative
acer...monte carlo neutron and photon data (67): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    42 for mt= 91 e= 1.199E+01
```

69. An angular distribution is negative
acer...monte carlo neutron and photon data (68): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    52 for mt= 91 e= 1.234E+01
```

70. An angular distribution is negative
acer...monte carlo neutron and photon data (69): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found  
       60 for mt= 91 e= 1.269E+01
```

71. An angular distribution is negative
acer...monte carlo neutron and photon data (70): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       71 for mt= 91 e= 1.304E+01
```

72. An angular distribution is negative
acer...monte carlo neutron and photon data (71): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       71 for mt= 91 e= 1.340E+01
```

73. An angular distribution is negative
acer...monte carlo neutron and photon data (72): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       69 for mt= 91 e= 1.375E+01
```

74. An angular distribution is negative
acer...monte carlo neutron and photon data (73): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       57 for mt= 91 e= 1.410E+01
```

75. An angular distribution is negative
acer...monte carlo neutron and photon data (74): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       47 for mt= 91 e= 1.445E+01
```

76. An angular distribution is negative
acer...monte carlo neutron and photon data (75): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       59 for mt= 91 e= 1.481E+01
```

77. An angular distribution is negative
acer...monte carlo neutron and photon data (76): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       46 for mt= 91 e= 1.516E+01
```

78. An angular distribution is negative
acer...monte carlo neutron and photon data (77): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       12 for mt= 91 e= 1.551E+01
```

79. An angular distribution is negative
acer...monte carlo neutron and photon data (78): Neg. P(Ejμ) (b)

```
---message from ptleg2---negative probs found  
       17 for mt= 91 e= 1.586E+01
```

80. An angular distribution is negative
acer...monte carlo neutron and photon data (79): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    2 for mt= 91 e= 1.622E+01
```

81. An angular distribution is negative
acer...monte carlo neutron and photon data (80): Neg. $P(Ej\mu)$ (b)

```
---message from ptleg2---negative probs found
    2 for mt= 91 e= 1.657E+01
```